

## METHOD AND APPARATUS FOR OPTICAL SYSTEM COHERENCE TESTING

### ABSTRACT

The present invention is directed at a coherence test reticle or lithographic plate, and a method for testing the coherence of a laser beam using the test reticle. The quality or coherence of the laser beam is measured by illuminating the test reticle and the recording and/or analyzing the optical patterns generated by the illumination. The technique was designed for, but not limited to, the characterization of laser-based systems via the detection of optical radiation modulated by transmissive, reflective and diffractive patterns printed on a reticle or lithographic plate designed specifically for this purpose. The novelty and advantages over the prior art are insensitivity to vibration, alignment, and multi-path differences of classical interferometric coherence measurement techniques. Spatial coherence and longitudinal or temporal coherence may be measured independently. Vertical and horizontal coherence may be measured independently. The technique is focus error insensitive. That is to say, that focus errors will be recorded by the technique in a deterministic fashion and can be removed from the data. The robustness and convenience of the technique is driven by the single plate with no optical alignment, making the technique easily implemented in the field. The multiplexing of the feature orientations, sizes and line types and feature locations allows for the determination of coherence parameters as a function of position in the beam.

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